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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/643,344
Filing Date: August 19, 2003
Appellant(s): WEINBERG ET AL.

Howard M. Ellis
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 29 March 2007 appealing from the Office action mailed 2 August 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 3,944,473 SPAEPEN et al 3-1976

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

----- Claims 28-30 and 33-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pons et al (WO 90/10935) in view of Spaepen et al (US 3,944,473).

Pons et al teach (see pages 19-29) an apparatus for electrolyzing water for the production of hydrogen, oxygen and heat that included an electrochemical cell having a palladium cathode (i.e.-isotopic hydrogen storage cathode) wherein the produced hydrogen was adsorbed into the cathode, an electrically conductive anode and a compartment for holding an ionically conducting electrolyte comprising water and a pulsed power supply for the electrochemical cell comprising a means for generating a repeating sequence of voltages across the anode and cathode.

The difference between the claimed apparatus and the apparatus of Pons et al is that the pulsed power supply of Pons et al generates only a single voltage regime consisting of a voltage sufficient to enhance cathodic absorption of hydrogen. Thus, Pons et al fail to teach a second voltage regime consisting of at least one voltage pulse which is at least two times the voltage of the first cell voltage regime in magnitude with a duration not greater than 0.10 seconds.

Spaepen et al teach (see abstract) a method of influencing an electrocatalytic reaction proceeding at an electrode. The method included superimposing a voltage regime of pulses upon the cell voltage to enhance the efficiency of the cell. Spaepen et al further teach a pulsed power supply for providing the voltage regime of pulses.

Spaepen et al expressly disclose (see col. 1, lines 52-57 and col. 2, line 49 to col. 4, line 22) using the process with the oxidation of methanol on a platinum electrode or the oxidation of hydrogen, hydrazine or ammonia on an alloy electrode. However, Spaepen et al further teach (see col. 4, lines 23-35) that the principle of the invention would aptly apply in any electrocatalytic reaction where the at least two reactions occur at an electrode and the overall reaction included a series of partial reactions occurring at the electrode, the voltage pulse regime could be used to favor one reaction product versus another to preferentially form a desired product as opposed to forming the undesired product.

It is noted that Pons et al teach (see page 25) that multiple reactions occur at the cathode of the cell, some forming the desirable adsorbed hydrogen/deuterium, and others forming undesired hydrogen/deuterium gas.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the pulsed power supply of Spaepen et al to the apparatus of Pons et al for executing not only the voltage regime taught by Pons et al (simple pulsed voltage), but further to apply the potential pulse train taught by Spaepen et al because Spaepen et al teach that the potential pulse train was capable of allowing preferential formation of a desired product when multiple reaction products could be formed at an electrode.

Regarding the fact that the voltage pulse was of a magnitude at least twice the size of the first voltage regime and the duration was no longer than 0.10 seconds, the pulsed power supply of Spaepen et al would have been capable of operating with the claimed operating parameters. Since these parameters are related to the manner of

operation of the claimed apparatus, they have not been given patentable weight since the apparatus of Pons et al in view of Spaepen et al would have been fully capable of operating in the claimed fashion. See MPEP 2114.

Regarding claims 29, 30, 33-41, each of these claims are related to the manner of operation of the claimed apparatus, thus, they have not been given patentable weight since the apparatus of Pons et al in view of Spaepen et al would have been fully capable of operating in the claimed fashion. See MPEP 2114.

(10) Response to Argument

Appellant has argued that:

(a) Spaepen et al teach pulse durations in the range of minutes to hours at col. 1, lines 16-19.

In response, the disclosure of minute to hours long pulses at col. 1, lines 16-19 is related to previously known pulses for removing aging phenomenon, not the continuous influence of electrocatalytic reactions (see col. 1, lines 29-37), which have significantly lower pulse durations (see col. 1, lines 52-57, 60-61 and paragraph spanning cols. 2 and 3).

(b) It is unclear from reading Spaepen et al what the rationale was for combining with the teachings of Pons et al.

In response, as set forth in the rejection grounds above, (1) Pons et al teach (page 25) that there was at least one competing electrochemical reaction (ii) which operated in reverse of the desired electrochemical reaction (i); and, (2) Spaepen et al teach (see col. 4, lines 23-39) that when faced with multiple, competing electrochemical

reactions, a potential pulse train could be superimposed upon the applied potential for the purpose of permitting preferential selection of one of the electrochemical reactions, and that the exact duration and magnitude of the pulse train was known to be result effective depending upon the competing reactions. Therefore, one of ordinary skill in the art would have been motivated to have added the capability of applying a suitable potential pulse train as suggested by Spaepen et al to the power supply of Pons et al for the purpose of permitting preferential "selection" of reaction (i) over reaction (ii).

(c) Spaepen et al do not teach application of the potential pulse train with electrolysis of water.

In response, the specific embodiments disclosed by Spaepen et al admittedly do not include electrolysis of water. However, the teachings of Spaepen et al should not be limited only to the working examples. The teachings of Spaepen et al should be interpreted as a whole, and the disclosure at col. 4, lines 23-39) clearly show that Spaepen et al contemplated using the potential pulse train with other electrolysis reactions, particularly where multiple competing reactions were occurring.

(d) Spaepen et al do not teach that the inventive pulse regime obviates aging phenomenon.

In response, the rejection grounds do not rely at all on the disclosure of Spaepen et al with respect to aging phenomenon.

(e) The record fails to show a clear reason or suggestion why one of ordinary skill in the art of electrolyzing water would have included the pulsed regime of Spaepen et al in the method of Pons et al.

In response, it is noted that Pons et al do not teach only the electrolysis of water, but actually teach a series of reactions (see page 25) that compete with the system. Thus, the teachings of Pons et al should not be construed as being related only to the method of electrolyzing water.

(f) Pons et al do not teach two competing reactions at the cathode.

In response, per page 25 of Pons et al, reactions (i) (adsorption of hydrogen/deuterium into the cathode) and (ii) (deadsorption of hydrogen/deuterium from the cathode) are both electrochemical reactions (both consume electrons). Thus, Pons et al clearly teach that two electrochemical reactions occurred at the cathode, one which was the desired reaction (i), and one which was undesired (ii). Attention is directed to page 4 of Pons et al, in the first full paragraph, particularly the last sentence. The objective of Pons et al is the adsorption of hydrogen/deuterium into the cathode, not production of hydrogen/deuterium gas.

(g) The Board has previously struck down the combination of Pons et al and Spaepen et al.

In response, in the parent application 08/334,952, which issued as US 6,638,413, the cited motivation for combination between Pons et al and Spaepen et al by the Examiner was to alleviate aging phenomenon. As is clearly set forth above, the current rejection grounds do not rely on the teaches of Spaepen et al with respect to aging phenomenon. Thus, in the Examiner's opinion, the Board decision in the parent application is not applicable to the current rejection grounds because it did not take into account the teachings of Spaepen et al at col. 4, lines 23-39).

(h) Dependent claims 29-30 and 33-41 are patentable over the combination of Pons et al and Spaepen et al because these claims impart structure to the claimed invention.

In response, Appellant has failed to claim specific structure which provides the claimed functionality. Further, the power supply suggested by Spaepen et al was capable of adjusting the duration and magnitude of the potential pulse train. As such, the structure of the prior art would have been capable of operating with the claimed parameters.

(i) The Examiner improperly relies on inherency in rejection claims 29-30 and 33-41.

In response, the Examiner did not and has not asserted that the features of claims 29-30 and 33-41 are inherently present in the disclosures of Pons et al or Spaepen et al. The Examiner has set forth that the limitations of claims 29-30 and 33-41 are related to the manner of operation of the claimed structure, and, as such, per MPEP 2114, as long as the prior art structure was capable of operating in the claimed fashion, the prior art meets the limitations of the claims. Appellant has failed to respond with arguments showing that the claimed features require different structural features. The suggestion of Spaepen et al that the duration and magnitude of the potential pulse train were result effective (col. 4, lines 23-39) shows that these variables would have been operatively adjustable in the power supply provided. Thus, the power supply suggested by the combination of Pons et al and Spaepen et al would have been capable of applying the potential pulse train over the potential regime of Pons et al in a manner consistent with the limitations of claims 29-30 and 33-41.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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